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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/763,691
Filing Date: January 22, 2004
Appellant(s): REINHARD, FRED P.

William W. Schaal
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 12/18/09 appealing from the Office action mailed 6/25/09.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

5,352,345	Byszewski et al.	10-1994
5,225,054	Boateng	7-1993

(9) Grounds of Rejection

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Byszewski et al. (Byszewski), U.S. Patent 5,352,345.

Byszewski discloses a system as recited in claims 1, 3, 6, 7 having an impurity separation subsystem, which impurity separation subsystem is an ion exchange unit (reference number 401 in figure 5 and col. 7, line 20-25) and an electrolytic membrane separation subsystem, which EMS subsystem comprises a first cell compartment comprising an anode compartment housing an anode having inlet and outlet positioned as claimed, a second cell compartment comprising a cathode compartment housing a cathode having inlet and outlet positioned as claimed, at least one membrane positioned between the anode and cathode compartment (see figures 3 and 4 and col. 5, lines 22 to 58 and col. 6, lines 29 to 65 as well as claims 11 and 13). The solution coming from the ion exchanger is fed through either the anode compartment (figure 3) or the cathode compartment (figure 4) as recited in claims 8-11 and 13-16. The EMS subsystem is capable of increasing the concentration of the reject solution which comes from a solution used to regenerate the resin and for the reuse of the concentrated regeneration solution as recited in claims 2 and 4 (see Abstract). The patent further discloses the use of a pre-filtration system; if the reduction of certain impurities is desired as recited in claim 12 (see col. 5, lines 62-66). Indeed, the patent teaches that the concentration of the regenerant can be accomplished by reverse osmosis (col. 4, lines 39-43). This teaching may further read upon the impurity separation subsystem,

since the specification teaches that such reverse osmosis modules can by the separation subsystem (page 6, third line from the bottom).

The Byszewski patent while teaching the improvements obtained by the pre-concentration (see col. 5, lines 2-9), fails to disclose the use of off-gassing to increase the concentration.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Byszewski by the teachings of contained therein.

One having ordinary skill in the art would have been motivated to do this modification, because the patent teaches the economic benefits obtained by a pre-concentration and off-gassing is routinely used to increase the concentration.

Claims 17-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Byszewski as applied to claims above, and further in view of Boateng, U.S. Patent 5,225,054.

The Byszewski patent discloses the claimed method comprising providing an electrolytic membrane separation sub-system that comprises a plurality of compartments, supplying a brine solution having a first volume and an increased level of an impurity to a first compartment of the plurality of compartments, supplying a conductive solution to a second compartment of the plurality of compartments, the conductive solution having a second volume, the exact volume would have been

predetermined by the ordinary artisan by routine experimentation and optimization, energizing the electrodes to cause all ions to migrate towards the oppositely charged electrode and outputting the conductive solution having the impurity (see figures 3-5 and col. 5, lines 39-61). The patent further teaches that the regenerated solution can be reused in the regeneration of ion exchange resins (see Abstract). The patent teaches that the impurity can encompass heavy metals, such as multivalent metals (see col. 5, lines 62-69).

The Byszewski patent while teaching the improvements obtained by the pre-concentration (see col. 5, lines 2-9), fails to disclose the use of off-gassing to increase the final concentration. Indeed, the patent teaches that the concentration of the regenerant can be accomplished by reverse osmosis (col. 4, lines 39-43). This teaching may further read upon the impurity separation subsystem, since the specification teaches that such reverse osmosis modules can by the separation subsystem (page 6, third line from the bottom).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Byszewski by the teachings of contained therein.

One having ordinary skill in the art would have been motivated to do this modification, because the patent teaches the economic benefits obtained by a pre-concentration and off-gassing is routinely used to increase the concentration.

The Byszewski patent is silent on the use of electrodes in each compartment; rather it uses bipolar membranes to split the water producing the hydroxyl for the base compartment and the hydrogen ions for the acid compartment.

The Boateng patent is cited to show a functionally equivalent structure used in the art to produce a base and acid in their respective compartment, by using electrodes separated by a membrane to form the hydroxyl and hydrogen ions by the electrolysis of water (see figure 1 and abstract).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Byszewski by the teachings of Boateng.

One having ordinary skill in the art would have been motivated to do this modification, because the Boateng patent teaches the use of anode and cathode in each compartment to form the hydrogen and hydroxyl ions respectively by the splitting of water to from acid and base in the anode and cathode chambers respectively.

(10) Response to Argument

Claims 1-13 are apparatus claims. Accordingly little or no patentable weight is given the many process and functional limitations, since these limitations fail to differentiate the claimed apparatus from the prior art apparatus having the same structural limitations.

The Board of Patent Appeals and Interferences in *Ex Parte Masham*, 2 USPQ 2d 1647 (1987) stated, "a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the structural limitations of the claimed." The device

"does not undergo a metamorphosis to a new apparatus merely by affixing instructions thereto on the use."

Appellant argues that since "the base depleted regenerant 422 is pretreated to remove impurities such that it cannot correspond to 'a reject solution with an elevated level of the selected impurity'." It is unclear what structure this functional limitation is meant to encompass.

In any event, the Byszewski patent teaches that, the pretreatment, such as micro or ultrafiltration, of the exhausted regenerant **may be required to remove multivalent metals and dissolved organics**, but that the concentration of multivalent metals is generally low in the spent regenerant implying that no such pretreatment is a necessity (col. 5, lines 62-69). Indeed it appears that only when anion membranes are used, would this removal be required (see col.6, lines 47-53). The embodiment disclosed in figure 3 of the Byszewski patent does not use anion membranes and accordingly would not require the removal of the multivalent metals.

Furthermore, in the portion recited by appellant on page 9 of the brief, only suspended solids are filtered out and removed from the system. The impurity in the present claims, while they would read upon any type of impurity, including suspended solids, would have to be dissolved in the solution to constitute an impurity capable of being removed by an EMS subsystem.

As a matter of fact, according to the definition of "brine solution" on page 5 of the specification, the brine solution would encompass a concentrated impurity solution.

Clearly such a broad disclosure in the specification and claims would read upon the apparatus disclosed in Byszewski, even if multivalent metals and dissolved organics are required to be removed (which they are not). The "brine solution" of Byszewski is composed of NaCl, Na_2SO_4, NaOH and Na_2SiO_3 (example 1 in col. 9, lines 55-57), which when fed to a an EMS shown in figure 3 results in transfer of the selected impurity, such as a monovalent ion (in figure 3, the selected impurity or monovalent ion is sodium ions).

Appellants further argue, "even assuming that the anions and cations correspond to "selected impurities", as recited in claim 1, the ion exchanger simply provides the base depleted regenerant 422, which does not include an elevated level of the selected impurity (i.e., cation)." There is no claim basis for the impurity being cation. Furthermore, the specification nor the claims disclose or patentable define the relative terms, such as "elevated level of the selected impurity."

It is well settled that unpatented claims are given the broadest reasonable interpretation consistent with the supporting specification, and that limitations in the specification are not read into unpatented claims without a proper claim basis therefore. *In re Prater*, 415 F. 2d 1393, 162 USPQ 541 (CCPA 1969); *In re Zletz*, 893 F. 2d 319, 13 USPQ 2d 1320.

In any event, ion exchangers are used to produce an output solution having lowered amounts of the ions removed by the ion exchanger (see col. 1, lines 23-55). When the ion exchanger is exhausted, it is regenerated by a regenerating solution

which removes the ions that were adsorbed on the exchanger (see abstract of Byszewski). This solution will comprise the "brine solution" of the instant application, because it comprises a water solution with "certain minerals"..."not limited or restricted to the targeted impurities."(specification page 5 for definition of brine solution).

Figure 3 of Byszewski shows the removal of cation impurity would require the use of and EMS subsystem with cation membranes and the feeding of the "brine" adjacent the anode compartment (cations being positive would move towards the cathode and away from the anode). If the desired impurity is an anion impurity, one having ordinary skill in the art would use an EMS subsystem with anion membranes and feed it away from the anode chamber (see figure 4 of Byszewski) showing the movement of anions towards the anode through anion membranes).

Appellants further argue that "in support of Appellant' s position, the operations of the ion exchanger portion illustrated in Figure 5 of Byszewski recites that "the filtered, exhausted anion exchange regenerant is fed into the base purification unit, 409, via line 408. The recovered base is withdrawn from the base purification unit via line 410. The base depleted exhausted regenerant is removed from the base purification unit via line 412." (Byszewski, col. 7, lines 27-33; Figure 5). Emphasis Added. Accordingly, the ion exchanger produces the base depleted regenerant 422 and supplies this regenerant to the electrodialytic water splitter 428 with the recovered base withdrawn via line 410. Therefore, in contrast with the operations of the impurity separation subsystem, the ion exchanger supplies base depleted exhausted regenerant 422 having a decreased level

of the selected impurity, allegedly the cation, rather than an elevated level as delineated in the claim. Hence, Byszewski teaches away from the claimed invention."

This piecemeal analysis of the reference fails to take into account the embodiments recited in claims 11 and 13. Claim 11 recites an impurity separation subsystem and an EMS subsystem. The EMS subsystem is the base purification unit 409. Therefore appellant's reading of that Byszewski patent "fails to teach the impurity separation subsystem that produces a reject solution with an elevated level of a selected impurity as claimed because the base depleted exhausted regenerant 422 cannot be interpreted as being the reject solution as recited in claim 1" is untenable. The reject solution is the exhausted regenerant from the ion exchanger having "elevated levels" of the "impurity".

Appellant further argues that the recovered base 410 cannot correspond to the "the output solution being the feed water having a substantially reduced level of the impurity."

The examiner has never stated that the recovered base 410 corresponds to the output solution. Purified output from an ion exchanger would be a solution having ions removed by said ion exchanger (col. 1, lines 23-33). Only when the ion exchanger is exhausted and needs to be regenerated, is the "brine solution" fed through the exchanger to produce a reject solution having an elevated level of the "selected

impurity" (col. 1, lines 39-55). Accordingly, the use of the ion exchanger reads upon the limitations recited in claim 1 and 3.

Appellant mischaracterizes a prior remark by the examiner by stating "the Examiner previously alleged that base depleted exhausted regenerant constitutes the reject solution, the Examiner thus contends that the recovered base corresponds to the output solution. Appellant respectfully disagrees."

The correct comment from the prior Action is, "With respect to the arguments regarding claim 1, applicants state that the 'subsystem does not remove the impurity from feed water, instead a depleted salt solution is produced.' A depleted salt solution would read upon a feed water having impurity removed from it."

Therefore, the scope of the claims, when the claims are read in light of the specification, is clearly encompassed by the Byszewski patent.

With regard to claims 13-16 appellant makes the same allegations.

Appellant states, "As discussed above, the base depleted regenerant 422 (1) is pretreated to remove impurities and (2) even assuming that cations are impurities, is base depleted such that base depleted regenerant 422 cannot correspond to the brine solution having an elevated level of at least one type of impurity."

As demonstrated above, the Byszewski patent does not require the removal of impurities. Furthermore, by doing a piecemeal analysis and skipping over entire

portions of the disclosure appellant arrives at a reading which does not read upon the claimed invention.

Appellant further argues that an EMS disclosed in Byszewski produces a solution that cannot correspond to the brine solution "that may be reused for regeneration of an ion exchanger resin."

What the solution produced in any of the EMS subsystems disclosed in the Byszewski patent are used for is given little or no patentable weight in an apparatus claim, in particular since the it "may be reused". One **may** reuse the Byszewski "brine solution" in any capacity.

With regard to claims 17-21, appellant makes the same allegations that the solution coming out of an EMS cannot be "the brine solution having an increased level of at least one type of impurity."

That limitation has no claim basis. The claim rather recites "supplying a brine solution having a first volume and an increase level of an impurity to a first compartment". As demonstrated above, Byszewski disclose such a method step of supplying a "brine solution" having an "increased level of an impurity to a first compartment." (see claim 11).

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Arun S. Phasge/

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